

What is claimed is:

1. A piston rod position detecting mechanism for detecting the position of a piston rod connected to a piston slidably mounted in a cylinder having both ends thereof closed, said mechanism comprising a detecting coil provided at one end of said cylinder from which said piston rod protrudes out of said cylinder, and a flange provided on said piston rod opposite to said detecting coil to detect the position of said piston rod by a detection signal based on a change in inductance of said detecting coil which changes with the change in the position of said flange and thus said piston rod.
2. The piston rod position detecting mechanism as claimed in claim 1 wherein a coil spring is mounted between said flange and one end of said cylinder.
3. The piston rod position detecting mechanism as claimed in claim 2 wherein said flange is a ring of a magnetic material.
4. The piston rod position detecting mechanism as claimed in claim 2 wherein said flange is a nonmagnetic conductive ring.
5. The piston rod position detecting mechanism as claimed in claim 2 wherein said flange is a presser ring press fitted on said piston rod.
6. The autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to

protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 2 is provided at an end at which said piston rod protrudes from said cylinder.

7. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 2.

8. The piston rod position detecting mechanism as claimed in claim 1 wherein said flange is a nonmagnetic conductive ring.

9. An autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 8 is provided at an end at which said piston rod protrudes from said cylinder.

10. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 8.

11. The piston rod position detecting mechanism as claimed in claim 1 wherein said flange is a presser ring press fitted on said piston rod.

12. An autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 11 is provided at an end at which said piston rod protrudes from said cylinder.

13. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 11.

14. An autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 1 is provided at an end at which said piston rod protrudes from said cylinder.

15. The autotensioner as claimed in claim 14 wherein a snap ring for fixing an oil seal for closing one end of said cylinder is mounted on the inner wall of said cylinder, and wherein one end of said coil spring is in abutment with said snap ring.
16. The autotensioner as claimed in claim 14 wherein said detecting coil is mounted to one end wall of said cylinder through a bobbin for housing said detecting coil, and wherein one end of said coil spring is in abutment with one side wall of said bobbin.
17. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 1.
18. A piston rod position detecting mechanism for detecting the position of a piston rod connected to a piston slidably mounted in a cylinder having both ends thereof closed, said mechanism comprising a detecting coil provided at one end of said cylinder from which said piston rod protrudes out of said cylinder, a coil spring mounted around said piston rod so as to be opposite to said detecting coil, said coil spring having one end supported on one side wall of said cylinder and the other end secured to said piston rod, whereby detecting the position of said piston rod by a detection signal based on a change in inductance of said detecting coil which change with the change in the position of said piston rod.
19. The piston rod position detecting mechanism as claimed in claim 18, further comprising an exciting coil provided opposite to said detecting coil at the end of said cylinder from which said piston rod protrudes, said detecting coil and said exciting coil

being concentrically wound so that the magnetic lines of said each coil will be normal to the axial direction of said piston rod.

20. The piston rod position detecting mechanism as claimed in claim 19 wherein said exciting coil and said detecting coil are integrally formed.

21. The piston rod position detecting mechanism as claimed in claim 19 wherein another pair of said exciting coil and said detecting coil is provided opposite to each other.

22. An autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 19 is provided at an end at which said piston rod protrudes from said cylinder.

23. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 19.

24. An autotensioner comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a piston rod connected to said piston to protrude from one end of said cylinder, chambers defined in said cylinder by said piston, one of which is a pressure

chamber and the other is a reservoir chamber, said pressure chamber and said reservoir chamber being filled with hydraulic oil, and a rod spring for biasing said piston rod so as to protrude out of said cylinder, characterized in that the position detecting mechanism claimed in claim 18 is provided at an end at which said piston rod protrudes from said cylinder.

25. The autotensioner as claimed in claim 24 wherein a snap ring for fixing an oil seal for closing one end of said cylinder is mounted on the inner wall of said cylinder, and wherein one end of said coil spring is in abutment with said snap ring.

26. The autotensioner as claimed in claim 24 wherein said detecting coil is mounted to one end wall of said cylinder through a bobbin for housing said detecting coil, and wherein one end of said coil spring is in abutment with one side wall of said bobbin.

27. An electromagnetic valve comprising a cylinder having both ends closed, a piston slidably mounted in said cylinder, a pair of electromagnetic coils provided at both sides of said piston, a piston rod coupled to at least one side of said piston so that said piston rod has one end thereof protruding out of said cylinder, said piston being driven by the magnetic force of said electromagnetic coils to protrude and retract one end of said piston rod out of and into said cylinder, and the position detecting mechanism as claimed in claim 18.